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Thesis

On Vaccination

by

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In the year 1798 when Dr Jenner recommended to the world a species of cow pox, which he then supposed to originate from a disease called Grease in the horse's heels, accidentally communicated to the cow, as a substitute for small pox, how little could he at that time conceive the immensity of the benefit the researches, experiments, & enquiries he was then prosecuting would confer on future generations.

Experiments convinced scientists of that age, that the grease of the horses heel produced cow pox in the cow, although cow pox originated in the cow without any infection

from the horse.

An old authority (50 years ago) says, the disease appears as an epidemic among cattle, and only appears where cattle are grouped or herded together. It appears on the teats of the cows in the form of vesicles, of a blue colour, elevated at the margin, and depressed in the centre, surrounded by inflammation, and containing a limpid fluid. The animal is indisposed, and the secretion of milk lessened. Similar vesicles are produced on the hands of the milkers, attended with febrile symptoms, and sometimes tumours in the axilla. The affection is likewise liable to make its appearance in other parts where the cuticle is abraided, or naturally thin, provided active matter be applied.

The disease was, however, not very frequently noticed in England 50 years ago, as the inquiries of the National Vaccine Board, in 1828, failed to discover a single instance of it in that country.

One important point however, relating to cowpox, was established by Dr Jenner, and that was, that some of the milkers on a farm, where the disease was prevalent were rendered insusceptible to an attack of small pox, while others still remained susceptible to that disease. Further observation soon accounted for this seeming antagonism. It was found that those who caught the disease (cowpox) when the virus was in an active state, were insusceptible to small pox, while those who received the infection after it had undergone decomposition,

still remained susceptible to the pernicious contagion.

This uncertainty, for a time caused a doubt to arise about vaccination, and such violent opposition was created, and the practice of vaccination would not have been so heartily adopted, had not Jenner discovered this fallacy; and it was he who, likewise, discovered that the vesicle excited in the human subject by vaccine matter yielded a fluid of a similar nature with that which was inserted, and this experiment, the success of which was so essential to the extension of vaccination, crowned his efforts, by showing how a continuous and inexhaustible supply could be obtained sufficient to meet all requirements.

It is not claimed for this operation viz. Vaccination

that it renders the subject completely and permanently secure from an attack of small pox, but that it gives to many an immunity from the disease, while those who are attacked by it, have it in a milder form, which now goes under a special name viz. "Modified Small pox".

I have selected this subject, viz Vaccination, for my thesis, because for some time past a good deal of controversy has taken place, between various medical practitioners in this colony, on the propriety of vaccinating children with lymph obtained direct from the calf, as against vaccinating with humanised lymph; and I will endeavour to show that there are more dangers and more objections connected with the method of calf lymph

vaccination, as performed here, than with the method of vaccination from arm to arm; and that vaccination from calf lymph is altogether an undesirable practice to be pursued in this colony.

Some time ago, the Government of this colony established a farm, near Melbourne, calling it the "Model Farm" where lymph was obtained by vaccinating calves, and the lymph thus produced was supplied to the public vaccinators, and all other medical men, on application, throughout the colonies for vaccinating purposes. But lately it began to be noised abroad, that there was a very prevalent disease among the cattle of this colony, called "Tuberculosis in Cattle", which disease, I think might possibly be transmitted to the human subject, by vaccination.

On account of the rumor that this disease was so very common among colonial cattle, the Victorian Government appointed a board of scientific men to take evidence, and report on the matter, with the view of ascertaining the condition of the meat sent to the market for consumption. This board has had several meetings, but has not yet concluded its sittings and from the evidence given by medical practitioners, veterinary surgeons, cattle and stock inspectors, and breeders, it would appear that the disease, Tuberculosis, prevails to an alarming extent among cattle here, and that it is much more common than the public generally supposed it to be, and it appears to me that the practice of taking lymph from calves, indiscriminately, without any knowledge of the condition of the

health of their parents, to be an important and serious affair, if not even highly objectionable, and dangerous; for as I will show further on, although the parents of the calves are inspected and appear healthy, nevertheless it is found in many of them after being killed that the disease is already in an advanced stage, although no outward signs are perceptible. That the disease is also hereditary I will afterwards bring abundance of valuable and undoubted testimony to show.

Some extracts from the evidence given before the Tuberculosis Board, mentioned above, I will submit to you, from which it will be readily seen that the gentlemen who gave evidence, were men of undoubted skill, and well qualified to give an opinion.

It is a matter for serious consideration, because if the vaccine should happen to be taken from calves the progeny of stock suffering from an undoubted hereditary disease like Tuberculosis, and from a perusal of the evidence it will be seen that the chances are very often in favour of a calf from diseased parents being the one selected to supply the lymph, (on account of the prevalency of the disease,) then it becomes a serious question indeed, whether it will not ultimately prove fatal to the system of vaccination, even if the theory be accepted that no disease can be transmitted if lymph <u>without blood</u> be taken from the vesicle, and that it is the serum or corpuscles of the blood alone that can transmit hereditary

disease by vaccination.

These extracts are taken from the reports in the Melbourne Argus of the dates affixed.

Extracts

from evidence, given at meetings of Tuberculosis Board, composed of Dr Plummer, (chairman) Hon J. Buchanan, M.L.C., Professor Allen, & Dr Jamieson, held in Melbourne on 6th Feby 1884.

Mr Graham Mitchell, veterinary surgeon

8th Feby 1884. stated:- Had been acquainted with Tuberculosis in Scotland, & had seen cases more or less frequently since his arrival in this colony in 1854. Am of opinion that from 10 to 20 per cent. of the animals sold in the meat market were, in some degree, affected with Tuberculosis. It is common in aged cattle, & most of all in milch cows. It is hereditary, transmission in this way is the chief cause of its prevalence. Had not seen Tuberculosis in the muscular substance, but believed he had seen it in the loose tissue

between the muscles. He insisted strongly that the liver and heart, which are often eaten, are frequently affected. Believes that the disease is rapidly increasing, and that this increase dates especially since the year 1875 when innoculation of Pleuro-Pneumonia was introduced to lessen the severity of that disease. The innoculation of Pleuro-Pneumonia was performed in a carless way, by incompetent persons, and Tuberculosis was often introduced by mistake for Pleuro-Pneumonia. The two diseases being somewhat alike are often confused. The calves of tuberculous mothers often die young, and if not, a large proportion of them develop the disease later in life. If such calves suck tuberculous mothers they almost always die. He had seen healthy calves injured by

sucking tuberculous cows.

Mr John Phillips Vincent.

11th Feby 1884. a member of the Royal College of Veterinary Surgeons. said:- he had been a veterinary Surgeon for 50 years, over thirty being spent in Victoria. Dairy cattle were most liable to Tuberculosis. It was hereditary. He had repeatedly visited the abattoirs and seen many affected carcases there. It was certainly more common than formerly. Had seen tuberculous cows in the West Melbourne Swamp. The disease was abundant in the colony. Had examined 5 carcases about a week ago, two (2) were badly affected, Aged cattle were most commonly attacked but calves might suffer also.

Mr Samuel Durham,

11 Feby 1884 M. R. C. V. S. examined said:- He believed Tuberculosis to be

Hereditary. It might be developed in cattle two years old. The tendency increased with age. Milch cows were more prone to the disease than any other stock. The calves of tuberculous cows generally died of Tuberculosis, if they grew to maturity. He had never seen a case of congenital Tuberculosis, but Professor Williams stated that instances did occur. He believed the disease was infectious, if an infected animal were brought into a dairy, other animals would be apt to become tuberculous.

Mr Robert Shewitt Bird

11th Feby. 1884 M. R. C. V. S. said:- Tuberculosis was certainly hereditary, and communicable from beast to beast. He had noticed the disease at all ages from 2 till 10 years. Milch cows were more subject to it than all other cattle. If a tuberculous animal were

imported among healthy cattle, the disease would be apt to spread to the latter, but this would be far more likely to occur, where healthy and unhealthy animals were penned together in dairies, & feeding out of the same trough, than when simply grazing together on open pastures.

Mr John Aked M. R. C. V. S.

18th July 1884 said:- He had practised in this colony as a veterinary surgeon for 15 years. Tuberculosis was difficult to diagnose in its early stage, especially as an animal might for a time be in excellent condition though certainly diseased. It generally occured in old dairy cows. It is contagious, and hereditary. Had noticed that calves which sucked cows suffering from it generally died young, often at the age of

6 or 8 weeks. The disease was both infectious and contagious.

Mr William Tyson Kendall.

18th Feby 1884 M. R. C. V. S. said:- He had been 15 years engaged amongst stock. Thought the disease was widely spread and prevalent in Victoria. It was hereditary. Commonest among dairy cows. He had seen instances of congenital tuberculosis. Last year he had seen about 100 diseased animals. He had seen it in calves that had been still born. He had found it in the liver and lungs of calves within a week after birth. He thought the disease was common in the Melbourne dairies. He had seen several cases of tubercle of the brain & considered that ulceration of the intestines, was comparatively common, at least in

calves. and the udder was affected in many cows. The duration of the disease was very uncertain, it might be rapidly fatal, or might last for years, an animal perhaps being fat even after a year. It was hereditary, and he had satisfied himself of this by tracing cases. The chief cause of the prevalence of the disease in this country he thought to be hereditary transmission from affected imported stock.

25th Feby 1884

Mr John Gee. Superintendent of the City Abattoirs & Inspector of the Cattle yards, Melbourne. said:- He had been engaged amongst stock for half a century. He thought about 7 per cent of the animals slaughtered at the City Abattoirs were decidedly affected with Tuberculosis, and other 7 per cent presented the disease in a mild degree.

Among all the animals sold in the yards he could not say that more than 10 per cent showed any <u>evident signs</u> of disease. Some animals were condemned every week. He did not condemn the carcases of all tuberculous animals. Where the disease was advanced, with large nodules on the ribs, and the lungs ulcerated, and softened, and if there was any sign that the disease was extending into the meat, between the ribs, or in the skirt, that he condemned at once. He allowed a doubtful carcase to hang for a day, and if the meat were unwholesome, a peculiar mucus would exude from it. He wouldn't condemn simply on account of the presence of thoroughly softened tubercles, if the meat were firm, and if the tubercle could be cleared

away thoroughly, and if no unhealthy mucus came away after Lauging. He had seen tubercle in the flesh, in the skirt, brisket and axilla.

Mr Michael Cashmore.

25th Feby 1884. Meat Inspector for the city of Melbourne, and Central Board of Health said:- He had been 48 years in the colony. At least one third of all the cattle that came into the market are more or less touched with Tuberculosis, and Pleuro-Pneumonia.

Dr Bathe said:- He

1st March 1884 commenced cattle breeding in 1840. Had not an unhealthy animal young or old, for the first 5 years. The animals that became affected were the first cross from a Sydney lot, and an imported English short-horned bull, from which

they inherited a delicacy of constitution, and their mothers never showed the signs of disease. He had seen a tuberculous cow fat at 20 years of age, though she had been affected for 10 years. Heifers died in 5 or 6 months. It was more common than people thought because they did not know what it was. He had seen calves from tuberculous mothers badly affected with Rickets, and used up from consumption, at 6 weeks old. He had seen congenital Tuberculosis, and had seen the rudiments of the disease in the shape of little hard substances like millet seeds in a stillborn calf. It frequently happened that mistakes were made in inoculating, from animals suffering from Tuberculosis

instead of Pleuro-Pneumonia.
This he thought had quite as
much to do with the spread
of the disease, as hereditary transmission.

Mr Robert Stirling.

1st March 1884. Inspector of stock for the
Melbourne district, said:- He
had been connected with
Cattle for 35 years. During the
past year (1883) he had seen
over 100 cases. The disease
existed to some considerable
extent all over the colony.
In the cattle yards he thought
the proportion of cattle affected
would be something like
one per cent. of the numbers
penned for sale, but "many
more cases would be
discovered when the animals
were slaughtered." He thought
that in 15 to 20 per cent. of
the animals killed at
the city abattoirs Tuber-
culosis would be found.

in various stages.

From the perusal of some of these extracts it will be observed that not only have tuberculous masses been found in the lungs, liver, kidney heart and other organs but even in the muscles & intermuscular substance, and be it remembered, this can be seen with the naked eye. Is it not possible then that in these very cases the disease has penetrated still deeper and pervaded the whole system of the animal? that in fact we may find, with the aid of the microscope to be in every part of its body, those micro-organisms, called Bacilli, which almost always co-exist with tubercle wherever it is found. And we are informed by the recent researches of Dr Watson Cheyne that the

bacilli of bovine tuberculosis are much more numerous than in the same disease in the human subject.

"Lancet" Page. 1058. 16th June 1883.

Inoculations made on animals with some tubercles which were wanting in bacilli nevertheless led to the development of lesions, in which plenty of these micro-organisms could be detected, but this is not always the case, for instead of bacilli, zooglœa-like masses of micrococci, and other forms might be found. These facts mean that bacilli have anterior stages, in one of which they cannot be recognised at all, and in the other only under the form of aggregations of micrococci.

"Lancet". Page 445 17th March 1883.

Acute miliary tuberculosis in man resembles in every respect, in histological structure in tendencies, and in the presence of bacilli, the disease

produced in animals (lower) by the inoculation of tuberculous material, and there can be little doubt that the cause of the two diseases is the same, viz. the tubercle bacillus.

"Lancet" Page 583 7th April 1883.

The Bacillus of tubercle is transmissible from sick to healthy persons, it is found especially in localities where tuberculous men or animals, as oxen, are grouped together in numbers; in the morbid secretions of affected organs; in the liquid of normal secretions, and notably in milk. It can be transmitted by using the milk of tuberculous cows (Koch). Klebs made animals tuberculous by feeding them on the milk of tuberculous cows.

At the present time when the researches and discoveries of Koch of Berlin almost leave it without a doubt that Phthisis is a contagious disease, in so far

as, if a bacillus of tubercle
find its way into a person
previously healthy, and if it
should there find a suitable
midus for itself, it at once
begins its actively destroying and
fatal process. It is a matter of
great importance that all
medical men should do their
utmost to prevent the possible
direct introduction of the
bacillus into the arm of a
healthy child, and it is more
than probable that some of
these calves are so badly affected
with tuberculosis that they have
these bacilli in all parts of
their system, so that it is
hardly possible, in introducing
this vaccine, to avoid introducing
some of these bacilli along
with it. Of course if the
constitution of the child
be good, and it be strong &
healthy, and it have not
what the Germans call a

"predisposition" to tubercle, it may be able to neutralize or in some way or other destroy the action of the bacillus, or the bacillus itself, and thus escape the disease, but in some cases, it may be few, the constitution of the child will not be so able to destroy the virus, then it is clearly our duty to prevent even these few from being thrown in the way of this dreaded disease.

Many calves have been shown to be tuberculous, it is even congenital. Mr Kendall says (Page. 14,) he has seen it in still-born calves & has found it in the liver and lungs of calves within a week after birth. Dr Bathe says, heifers died from it in 5 or 6 months (Page, 18.) He has also seen calves, from tuberculous mothers, badly affected with Rickets, and used up from consumption at 6 weeks old. He has also seen congenital tuberculosis in a

stillborn calf. And these two gentlemen are persons of considerable experience and to whose opinions I think considerable weight and importance should be attached - especially to the latter one, who combines a medical training with his experience as a cattle breeder.

From the evidence given by each of the witnesses to the Tuberculosis Board, it is to be seen that a very large proportion of colonial stock suffer from Tuberculosis - In many it can be detected while alive, but in a great many more it cannot be so detected, and it is not until they are killed that the full extent of the disease is discovered, (see evidence of Mr Robert Stirling.) then it is found that cavities exist in the lungs, caseous masses in the liver, heart, kidneys and other organs, and even through the flesh and

between the muscles little yellowish white lumps are to be seen, which to the initiated represent tubercle, but to the general public only little lumps of fat. Many of these cases are allowed to pass uncondemned because the external evidence is not sufficient to condemn them & it is surprising, aye, and even disgusting, to read to what a diseased and filthy state a carcase must arrive before the inspector will consider himself justified in condemning it; the cool manner in which some of the witnesses gave their evidence, in reference to the amount of disease flesh contains while they consider it fit for human food, would have been amusing, had it referred to any other commodity than an article which forms such a conspicuous portion of our daily food. The idea that 20 or 30

per cent of the beef we eat being more or less affected with Tuberculosis, is horrible.

Now if it be possible for bulls and cows to be affected with tuberculosis, and this cannot be detected from external appearance, and it is known that the offspring of tuberculous cattle readily inherit the disease, surely it is, to say the least of it, running a risk, to have our children vaccinated with lymph from such calves. It may be said that the cattle and calves are previously inspected by competent men, before they are allowed to be used for vaccinating purposes, but as I have already shown there are many animals that will even then pass the inspection uncondemned, in which tubercular disease has already made good progress.

Again, the inspection carried on at the "Model Farm" may be as good as we can possibly

obtain, and even then, we have seen that it cannot be absolutely trusted to, there are many medical men living in various towns throughout the colony, who also use the calf lymph, but instead of using that supplied by the Model Farm, they cultivate the vaccine for themselves, obtaining promiscuously fresh calves every now and then, as they require them from farmers and dairymen in the district, without any enquiry whatever being made as to the state of the healths of these calves parents, and where no system of inspection of any kind is carried on. And we have seen that milch cows, which are the stock mostly kept by these farmers and dairymen, are of all classes of cattle the most liable to tubercular disease. Is it not possible then, nay even most probable, that the majority or

at all events a great many of these calves, that medical men obtain for themselves, are to some extent affected with Tuberculosis if not even saturated with it?

Seeing then that these are the kind of mothers that the medical men obtain most of their calves from, - from which the lymph is obtained - who is there to say, that they are healthy and in sound condition and that they are not the progeny of parents, which may even at that time be dying of consumption? In most cases the medical men never see the mothers of their calves, and never see the fathers, and thus have no knowledge whatsoever of its antecedents, but always taking it for granted that they are the progeny of healthy parents.

It is claimed for vaccination that it renders an immunity or at all events a

partial immunity from small pox by establishing a milder disease, now if in introducing this milder disease we at the same time introduce the germs of such a fearful disease as Tuberculosis, the practice of vaccination will soon fall into disrepute, and instead of being a benefit and blessing to mankind, it would be the very opposite. Again it may take years before the disease, (Tuberculosis) if indeed it be introduced by vaccination from calf lymph, is sufficiently developed to be noticed, and then in after years we may find that our young men and women, whom we are now vaccinating as babes, are to a greater or less extent affected with Tuberculosis, introduced directly by ourselves. and then it would be found that the disease would go on spreading from this newly created nucleus.

by heredity, and otherwise, and we should have to come to the unenviable and startling conclusion, that while we had been trying to prevent Smallpox, we had been harbouring, and nursing, and doing what we could to help the spread of a disease not inferior in its fatality to it viz. Phthisis. a disease which at the present time medical men in all parts of the ~~town~~ world are doing their best to stamp out or at least reduce in its extensiveness.

It has never been urged that in direct vaccination from healthy infants, Phthisis could be introduced. The principal objectors to the direct method of vaccination, satisfy themselves by saying, that there is a possibility of introducing Syphilis, Scrofula, and allied diseases. but how much more easy is it

to detect Syphilis in the child before us, or in the mother who brings the child, one may perhaps have a personal knowledge of the parents themselves - and have perhaps been their medical attendant for years. How much more easy then is it, I say, to detect, or even suspect in the infant before us, the elements of a disease, which it would be very objectionable, and highly unjustifiable in us, risking the introduction of into the arm of a healthy child, than to discover anything wrong in a calf when we see it?

A child, after the vaccination has taken, may be allowed to go, and no lymph taken from it, if there should be anything wrong with it (the child,) or its parents. or even if there is reason to suspect, that there is something in the constitution of the child.

which renders it an unfit & an undesirable subject from which to take lymph, ~~to~~ wherewith to vaccinate other children. This cannot, and, in fact, is not done, with calves, which are taken kap hazard, and of whose parents' health we know nothing. besides our inability to see in a calf, a disease, which in an infant, we would detect in our first glance at it.

My father, Dr James Boyd, with whom I am practising, has been a public vaccinator in this town for the last 27 or 30 years, during that time he has hardly used anything else but human lymph; during the last 20 years he has vaccinated, in all, some 11,669 cases, and in not a single instance has he had reason to think

that any disease was communicated by the lymph used, nor has he seen any but the most trifling inconvenience, and that only in a few cases, result from the practice of taking lymph from the arms of children.

In a young colony like this, where small pox has never been established, although it has been introduced on several occasions by being brought here by ships, from other countries, but in each instance the Government and local authorities have, with commendable promptitude, and by the enforcement of the strictest quarantine and other measures, successfully stamped it out. I say in this colony where small pox has never been established

it is a matter of great importance, that the practice of vaccination should be strictly enforced upon every individual, and in truth the law is very strict here as regards vaccination, still I think I have shown that if we continue the practice of vaccination with calf lymph, as at present carried on, we run the risk of introducing a disease which is not less objectionable and certainly more fatal ultimately, than smallpox itself.

From all these considerations I have come to the conclusion, that Calf lymph Vaccination in this colony is attended with more dangers and risks than direct vaccination from arm to arm, and as there is

no good reason, as yet brought forward, why the latter method should be abandoned in favour of the former, I think it would be much better for us, to adhere strictly to the latter, until such time arrives when it is shown that it itself is unsafe or dangerous. If calf lymph vaccination be continued in this colony, it will be apt to bring discredit upon the whole system of vaccination, and the benefit which was conferred on all mankind by Sir William Jenner's genius and discoveries will be distrusted ever afterwards.

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Sandhurst. Victoria.
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